Amendments to the Claims:

1. (Currently Amended) A method of improved coil sensitivity estimation for reducing artifacts in an MRI apparatus utilizing parallel imaging, the method comprising:

for a parallel imaging sequence, performing [a] at least one calibration sequence ~~relative to the~~ in conjunction with a parallel imaging sequence, using one of:

a spin echo type sequence matching the in-plane phase encode direction of both of the calibration and the parallel imaging sequences for each calibration; and

a gradient echo type sequence matching ~~the~~ an in-plane phase encode direction of both of the calibration and the parallel imaging sequences for each calibration.

2. (Original) The method as set forth in claim 1, wherein the calibration sequence is performed for each parallel imaging sequence.

3. (Original) The method as set forth in claim 2, wherein the calibration sequence is performed prior to each said parallel imaging sequence.

4. (Currently Amended) The method as set forth in claim 1, wherein the gradient echo type calibration sequence is performed with ~~a very short~~ an echo time~~, e.g.~~ less than 5 ms.

5. (Currently Amended) The method as set forth in claim 1, further including:

using ~~an essentially identical~~ a read out gradient of the same magnetitude and direction in both the calibration sequence and the parallel imaging sequence.

6. (Currently Amended) The method according to claim 1, wherein a phase encode direction of said calibration sequence is essentially directed ~~in~~ along a phase encode direction of said parallel imaging sequence.

7. (Previously Presented) An MRI apparatus having a sequence controller programmed to perform the method as set forth in claims 1.

8. (Cancelled)

9. (Currently Amended) ~~The~~ A magnetic resonance imaging (MRI) apparatus ~~as set forth in claim 8,~~ comprising:

an open magnet system which generates a B_0 magnetic field transverse to a long axis of a subject in an examination zone;

an RF system which excites and manipulates magnetic resonance in the examination zone;

a gradient system which spatially encodes the magnetic resonance;

a plurality of RF receive coils with differing sensitivity profiles which receive resonance signals in parallel;

a reconstruction processor which reconstructs received resonance signals into image representations;

a calibration processor which generates sensitivity profiles of the RF receive coils from image representations generated during a calibration scan;

a reconstruction processor which generates a diagnostic image from the sensitivity profiles and image representations generated during a diagnostic scan;

sequence control which accesses a calibration sequence memory to retrieve an RF refocused spin echo type sequence and controls the RF system and the gradient system in accordance with the retrieved calibration sequence to generate resonance signals for the reconstruction processor to reconstruct into calibration image representations and accesses a diagnostic imaging sequence memory to retrieve a diagnostic imaging sequence and controls the RF system and the gradient system to generate resonance signals for the reconstruction processor to reconstruct into the diagnostic image representations,

wherein the sequence control retrieves a phase encode gradient direction from the diagnostic imaging sequence memory and causes the gradient system to apply a phase encode gradient during the calibration sequence which is in the retrieved phase encode direction.

10. (Previously Presented) The MRI apparatus as set forth in claim 9, wherein the sequence control retrieves a read gradient from the diagnostic imaging sequence memory and causes the gradient system to apply the retrieved read gradient to read out echo signals during the calibration sequence.

11. (Cancelled)

12. (Currently Amended) The MRI apparatus as set forth in claim [8]9, wherein the sequence control applies a diagnostic imaging sequence other than a spin echo imaging sequence.

13. (Previously Presented) A magnetic resonance method comprising:

prior to conducting a parallel imaging sequence in which resonance data is phase encoded in a selected phase encode direction and resonance data is read out with a selected read gradient, conducting a calibration sequence including:

generating a series of spin echoes;

phase encoding the spin echoes in said selected phase encode direction;

generating sensitivity maps from the spin echoes;

conducting the parallel imaging sequence to generate resonance data;

reconstructing the resonance data into folded images;

unfolding the folded images using the generated sensitivity maps.

14. (Previously Presented) The magnetic resonance method as set forth in claim 13, wherein the calibration sequence further includes:

reading out the spin echoes using said retrieved parallel imaging sequence read gradient.

15. (Previously Presented) The magnetic resonance method as set forth in claim 13, wherein the parallel imaging sequence is a sequence other than a spin echo sequence.

16. (Currently Amended) The magnetic resonance method as set forth in claim 13, wherein the parallel imaging sequence and the calibration sequence are conducted in an examination region of an open MRI magnet system in which a main magnetic field is oriented orthogonal to a long axis of a subject.

17. (Currently Amended) The method as set forth in claim 1, wherein the method is performed in an examination region of an open magnet MRI system in which a B_0 magnetic field extends orthogonal to a long axis of a patient and rolls over ~~relatively gradually~~ at edges of a field of view which tends to cause phase errors.

18. (Previously Presented) The method as set forth in claim 17, wherein the calibration sequence uses spin echoes which refocuses phase errors, effectively cancelling the phase errors.

19. (Previously Presented) The method as set forth in claim 17, wherein the calibration sequence uses a gradient echo type sequence with a short echo time to minimize accumulated phase errors.